bromide (CTAB)-coated paclitaxel particles. CTAB-coated paclitaxel particles were prepared in accordance with the procedure described in Example 1, except that the CTAB particles were formulated using a solution containing phosphate buffer, glycerin, DSPE-mPEG 2000, Poloxamer 188, and CTAB.

[0146] The uptake kinetics of the paclitaxel suspensions are shown in FIG. **5** (results are shown as both percentages of paclitaxel positive cells after nanosuspension uptake and WI of cell associated/internalized particles). The DOTAP coating substantially improved the uptake of particles compared to CTAB-coated particles. These results suggest that enhanced uptake of paclitaxel particles is not solely attributable to the presence of a coating having both a positively charged group and a hydrophobic group.

Example 5

Uptake of Paclitaxel Particles Having a DOTAP Coating in Whole Blood

[0147] Whole blood was drawn from a healthy human donor into EDTA vacutainer (BD Biosciences). Paclitaxel nanosuspensions doped with Oregon Green-labeled paclitaxel were incubated with the whole blood (~10 μM final concentration) for 1 hour at room temperature in 1.7 mL microfuge tubes on a tube rotator. A fraction of the whole blood was exposed to a hypotonic lysing solution (BD Biosciences) to lyse the red blood cells. The lysed samples were then stained for CD14 expression. Both the whole blood and stained cells were analyzed via flow cytometry.

[0148] No apparent increase in Oregon Green fluorescence was observed in either the red blood cell (RBC) or platelet populations. A substantial increase in fluorescence was observed in the CD14+ monocyte population in the lysed samples using the DOTAP-formulated paclitaxel suspension. Paclitaxel formulations having a DSPE-mPEG 2000/poloxamer 188 coating also showed some uptake in the CD14+ monocyte population. There was no apparent uptake in the other major cell populations as assessed by Oregon Green fluorescence (data not shown). These results suggest that DOTAP-coated paclitaxel particles are selectively taken up by monocytes over red blood cells, platelets, and other cell types present in blood.

Example 6

Uptake by Mouse Peritoneal Macrophages of Paclitaxel Particles Having a DOTAP Coating

[0149] Peritoneal macrophages were isolated from mice and exposed to paclitaxel particles having a DOTAP coating and to paclitaxel particles without such a coating. Fluorescence images showed that peritoneal macrophages exposed to the DOTAP-coated particles took up greater amounts of paclitaxel than those exposed to DSPE-mPEG 2000/poloxamer 188-coated particles (data not shown). This example supports that DOTAP enhances uptake of particles by peritoneal macrophages.

Example 7

Uptake by Human OVCAR-3 Cells of Paclitaxel Particles Having a DOTAP Coating

[0150] Human OVCAR-3 cells were transfected with Red Fluorescent Protein (RFP) such that they fluoresced red. These cells were then exposed to paclitaxel particles prepared using Oregon Green-paclitaxel having a DOTAP coating and to paclitaxel particles without a DOTAP coating. Fluorescence images showed that the RFP-OVCAR-3 cells only took up particles when the particles were coated with DOTAP (data not shown). There was no visible uptake of the particles coated with DSPE-mPEG 2000/poloxamer 188. This example supports that DOTAP enhances uptake of particles by human ovarian cancer cells.

Example 8

Residence Time in Mice of Paclitaxel Particles Having a DOTAP Coating

[0151] Oregon Green-labeled paclitaxel particles having a DOTAP coating were injected subcutaneously into a mouse. Fluorescence images were captured over time to demonstrate particle residence time. The persistence of green fluorescence at 30 days indicated that paclitaxel particles remained for at least 30 days when injected subcutaneously (data not shown).

[0152] In a separate experiment, Oregon Green-labeled paclitaxel particles having a coating containing DOTAP and a rhodamine-labeled surfactant (Lissamine rhodamine B 1,2-dihexadecanoyl-sn-glycero-3-phosphoethanolamine, triethylammonium salt (rDHPE); Invitrogen, Carlsbad, Calif.) were injected intraperitoneally (IP) into a healthy mouse. Fluorescence images were captured over time to demonstrate particle residence time. The data indicated that paclitaxel nanoparticles were cleared rapidly (within about 24 hours) from the peritoneal space in a healthy mouse (data not shown).

[0153] A mouse model was established wherein test mice were implanted with RFP-OVCAR-3 cells and tumors were allowed to grow. The tumors expressed RFP and had red fluorescence. Oregon Green-labeled paclitaxel particles having a DOTAP coating were administered by intraperitoneal injection to mice having RFP-expressing tumors. The presence and location of the DOTAP-coated paclitaxel particles were detected relative to the tumors using fluorescence.

[0154] Both tumors and paclitaxel particles were observed by fluorescence microscopy (red fluorescence for tumors, green fluorescence for particles). Unlike healthy mice, in which particles were rapidly cleared from the peritoneal cavity, the DOTAP-coated paclitaxel particles were present in the tumor-bearing mice up to 30 days post-injection, indicating that the tumors present in the peritoneal cavity of the mouse were partially responsible for the increased residence time. Moreover, the DOTAP-coated paclitaxel particles frequently co-localized with tumors. Thus, this example supports that the DOTAP-coated paclitaxel particles target tumor sites as opposed to healthy tissues, and are able to persist within the targeted tumor sites for significant periods of time such that they can effectively deliver a sustained release of the therapeutic drug.

[0155] Additionally, when DOTAP-coated paclitaxel particles were present, the red fluorescence intensity diminished over time, consistent with tumor cell death. Conversely, in the absence of paclitaxel particles, the red fluorescence intensified over time. Thus, this example further demonstrates that administration of DOTAP-coated paclitaxel particles effectively treated cancer in vivo.

[0156] While specific embodiments have been illustrated and described, numerous modifications come to mind with-